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Document Number	Document Description	File Name	File Size(Bytes)	Multi Part	Pages

1	Miscellaneous Incoming Letter	310722-06.pdf	783917	no	1
Warnings:					
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2		310722-Amd.pdf	7932449	yes	10

Multipart Description

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Claims	3	9
Applicant Arguments/Remarks Made in an Amendment	10	10

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3	Extension of Time	310722-22.pdf	1186273	no	1
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4	Fee Worksheet (PTO-875)	fee-info.pdf	8319	no	2
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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	
	)	
Mamoru TSURUYA	)	Art Unit: **2838**
	)	
Serial No. **10/521,477**	)	Examiner: **Rajnikant B. Patel**
	)	
Filed: **January 19, 2005**	)	
	)	
For: **Power Factor Correction Circuit**	)	Attorney Docket No.: 44471/310722

CERTIFICATE OF ELECTRONIC FILING

I hereby certify that this correspondence is being electronically filed with the United States Patent Office via EFS Web on September 18, 2006

Janie Wilkins

Janie Wilkins

DATE: September 18, 2006

AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Office Action dated June 5, 2006 in the patent application identified above, please enter the following amendments and reconsider the application in view of the appended remarks. A request for a one-month extension of time accompanies this response.

- **Amendments to the Specification** begin on page 2 of this paper.
- **Amendments to the Claims** are reflected in the listing of claims which begins on page 3 of this paper.
- **Remarks** begin on page 10 of this paper.

KS Docketing

Docketed for:
Entered on: 9/22/06
Initials: MB
Previously Entered:

Amendments to the Specification:

Please replace the Title of Invention with the following amended title:

Power Factor ~~impoving~~ Correction Circuit

Please replace paragraph [0027] with the following amended paragraph:

[0027] FIG. 9 is a timing chart for signals of various parts of a power factor correction circuit of ~~a~~ the ~~second~~ first embodiment according to the present invention.

Please replace paragraph [0028] with the following amended paragraph:

[0028] FIG. 10 is a circuit structural view illustrating the power factor correction circuit of ~~the~~ a second embodiment.

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1-27. (Canceled)

28. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage;

a third series circuit including a first capacitor, and a third diode connected between a junction, between the zero-current switching reactor and the first diode, and the smoothing capacitor; and

a fourth diode connected between a junction, between the first capacitor and the third diode, and the smoothing capacitor.

29. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage;

a third series circuit connected to the main switch in parallel and including a third diode and a snubber capacitor;

a fourth series circuit connected between a junction, between the third diode and the snubber capacitor, and one terminal of the first diode and including a fourth diode, a regenerative winding wound on the booster reactor, a current limiting reactor and a regenerative capacitor; and

a fifth diode connected between a junction, between the regenerative capacitor and the current limiting reactor, and a junction between the other terminal of the first diode and the smoothing capacitor,

wherein the zero-current switching reactor and the current limiting reactor include a leakage inductor between windings of the booster reactor, and

wherein the booster reactor includes the wind-up winding and the regenerative winding that are wound on a core in a nondense-coupled condition with respect to the booster winding.

30. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage;

a third series circuit connected to the main switch in parallel and including a third diode and a snubber capacitor;

a fourth series circuit connected between a junction, between the third diode and the snubber capacitor, and one terminal of the first diode and including a fourth diode, a regenerative winding wound on the booster reactor, a current limiting reactor and a regenerative capacitor; and

a fifth diode connected between a junction, between the regenerative capacitor and the current limiting reactor, and a junction between the other terminal of the first diode and the smoothing capacitor,

wherein the booster reactor includes a core having first to third legs, in which a magnetic circuit is formed, and wherein the first leg is wound with the booster winding, the second leg is wound with the wind-up winding and the third leg is wound with the regenerative winding.

31. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage, and for controlling a switching frequency of the main switch in dependence on a value of an alternating current power-supply voltage of the alternating current power-supply,

wherein the control means includes:

first error voltage generating means for amplifying an error between the output voltage and a reference voltage to generate a first error voltage signal;

multiplied output voltage generation means for multiplying the first error voltage signal of the first error voltage generating means and the rectified voltage of the rectifying circuit to generate a multiplied output voltage;

current detection means for detecting an input current flowing through the rectifying circuit;

second error voltage generation means for amplifying an error between a voltage depending on the input current, detected by the current detection means, and the multiplied output voltage of the multiplied output voltage generation means;

frequency control means for generating a frequency control signal, by which a switching frequency of the main switch is varied, depending on a value of the alternating current power-supply voltage of the alternating current power-supply; and

pulse width control means for controlling a pulse width depending on the second error voltage signal of the second error voltage generation means and generating a pulse signal, by which the switching frequency of the main switch is varied, in dependence on the frequency control signal generated by the frequency control means, to allow the pulse signal to be applied to the main switch for controlling the output voltage to the given voltage.

32. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor; and

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage, and for controlling a switching frequency of the main switch in dependence on a value of an alternating current power-supply voltage of the alternating current power-supply,

wherein the control means is operative to set to switching frequency to a lower limit frequency when the alternating current power-supply voltage is less than a lower limit preset voltage and set the switching frequency to an upper limit frequency when the alternating current power-supply voltage exceeds an upper limit preset voltage while varying the switching frequency from the lower limit frequency to the upper limit frequency under circumstances where the alternating current power-supply voltage remains in a range between the lower limit preset voltage and the upper limit preset voltage.

33. (New) The power factor correction circuit according to claim 32, wherein the control means is operative to interrupt switching operations of the main switch under circumstances where the alternating current power-supply voltage is less than the lower limit preset voltage.

34. (New) A power factor correction circuit for correcting an input power factor by allowing a rectified voltage, obtained by rectifying an alternating current power-supply voltage of an alternating current power-supply with a rectifying circuit, to be inputted to a main switch via a booster reactor and allowing the main switch to be turned on or turned off while converting the power-supply voltage into a direct current output voltage, comprising:

a first series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including a booster winding and a wind-up winding, both wound on the booster reactor, a zero-current switching reactor, a first diode and a smoothing capacitor;

a second series circuit connected between one output terminal and the other output terminal of the rectifying circuit and including the booster winding of the booster reactor, and the main switch;

a second diode connected between a junction, between the booster winding and the wind-up winding of the booster reactor, and the main switch and the smoothing capacitor;

a rush current limiting resistor connected between the rectifying circuit and the smoothing capacitor and decreasing a rush current of the smoothing capacitor when the alternating current power-supply is turned on;

a semiconductor switch connected to the rush current limiting resistor in parallel; and

control means for controllably turning on and off the main switch to control an output voltage of the smoothing capacitor to a given voltage,

wherein the main switch includes a normally turned on type switch, and

wherein the control means is operative to:

turn the main switch off in response to a voltage developed across the rush current limiting resistor when the alternating current power-supply is turned on;

begin switching operations to turn on and off the main switch after the smoothing capacitor is charged; and

turn on the semiconductor switch after the switching operations of the main switch are commenced.

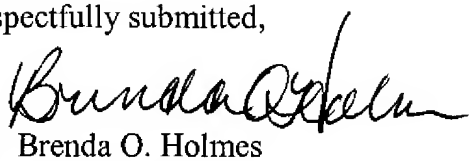
REMARKS

In the specification, paragraphs [0027] and [0028] have been amended to correct minor clerical errors.

Claims 1 to 27 have been canceled, and new Claims 28 to 34 have been added. The Examiner has acknowledged that claims 5, 10-12, 15, 17 and 19 are directed to allowable subject matter, and as such, new Claims 28 to 34 should be allowable since they encompass this allowable subject matter. Claim 28 is based on Claims 2 and 17, Claim 29 is based on Claims 2-5, Claim 30 is based on Claims 2-3 and 19, Claim 31 is based on Claims 2, 9 and 10, Claim 32 is based on Claims 2, 9 and 11, Claim 33 is based on Claim 12, and Claim 34 is based on Claims 2, 13 and 15.

Applicant respectfully requests that a timely Notice of Allowance be issued. If there are any issues that can be addressed via telephone, the Examiner is asked to contact the undersigned at 404.685.6799.

Respectfully submitted,



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